

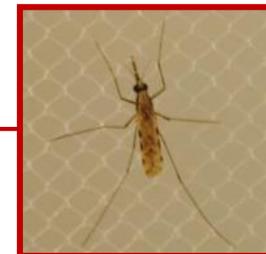
Electronic Mosquito Barriers: a non-chemical insect repelling technology using electric fields

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RBM VCWG, 03/02/2020



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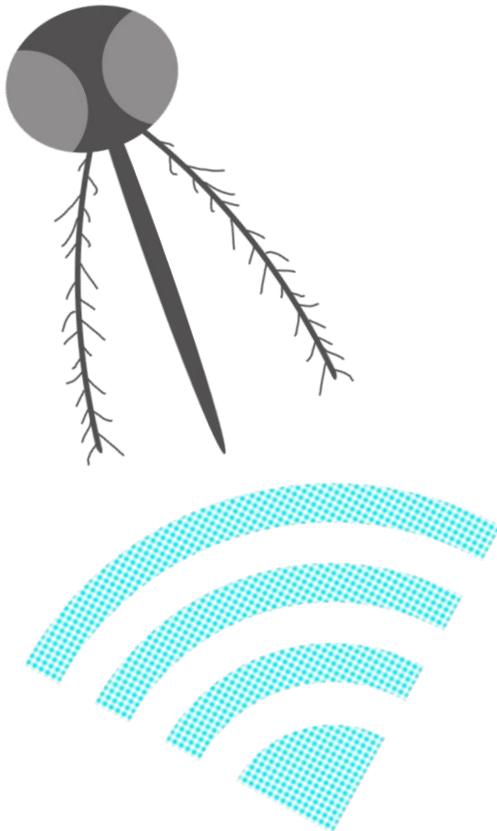
 Krijn Paaijmans



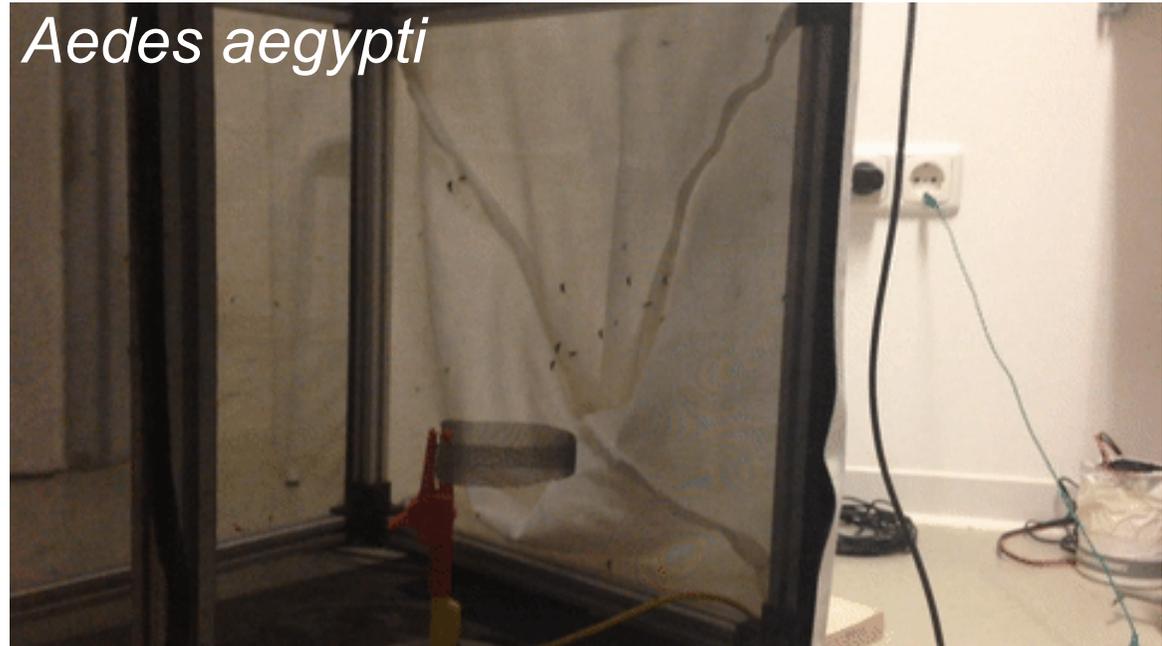
Why insects sense electric fields (hypothesis)



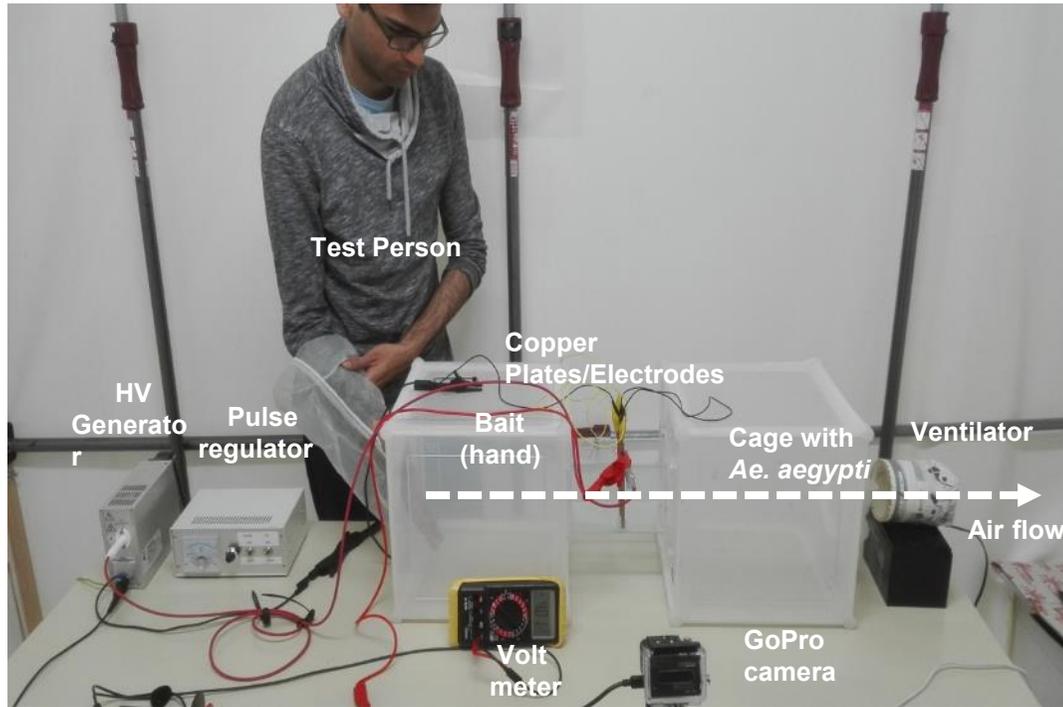
Cause hairs to bend, activating neurons at the base of the hair sockets, which allows the insects to “sense” the field



Aedes aegypti



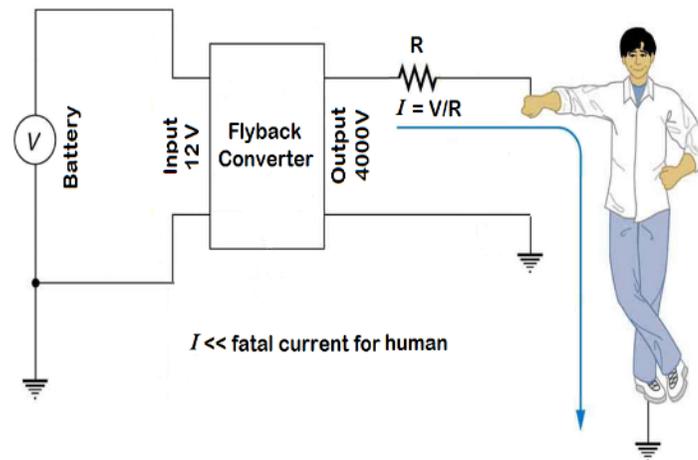
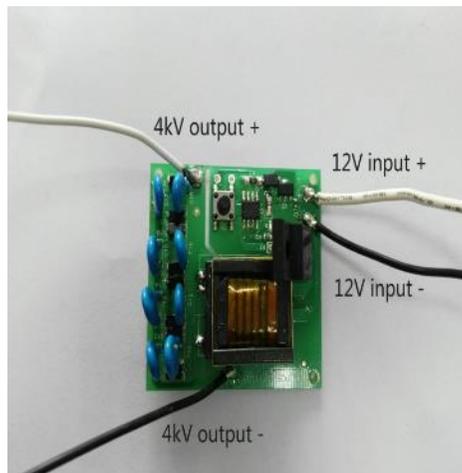
Electric fields and mosquitoes (*Aedes aegypti*)



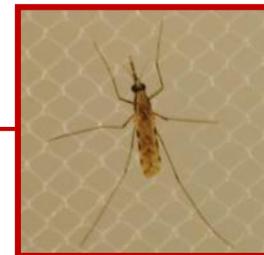
Hungry females

5min at test Voltage (a)
5min at 0 Volt (b)

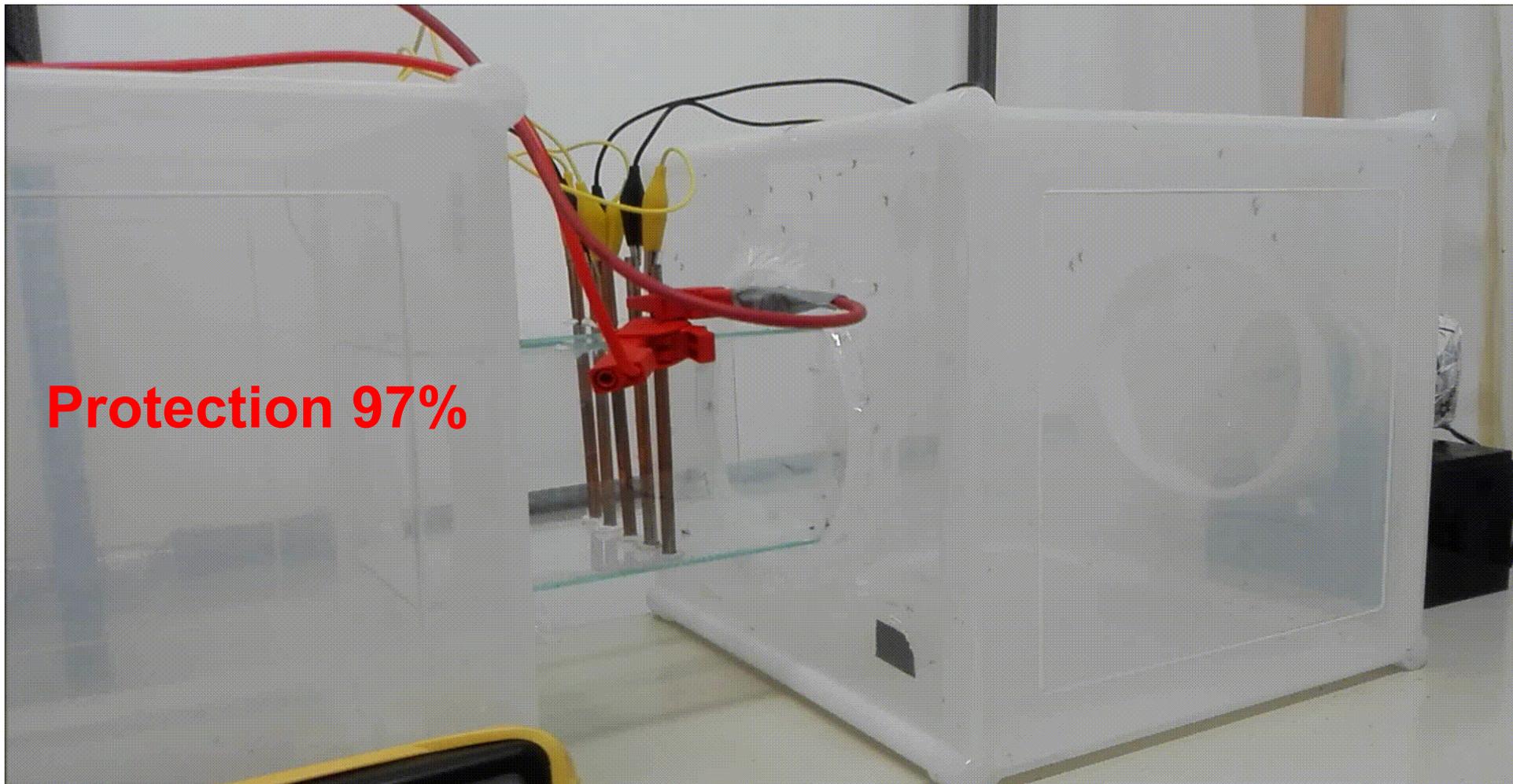
$$r = 1 - [a / (a + b)]$$



Electronic mosquito barriers

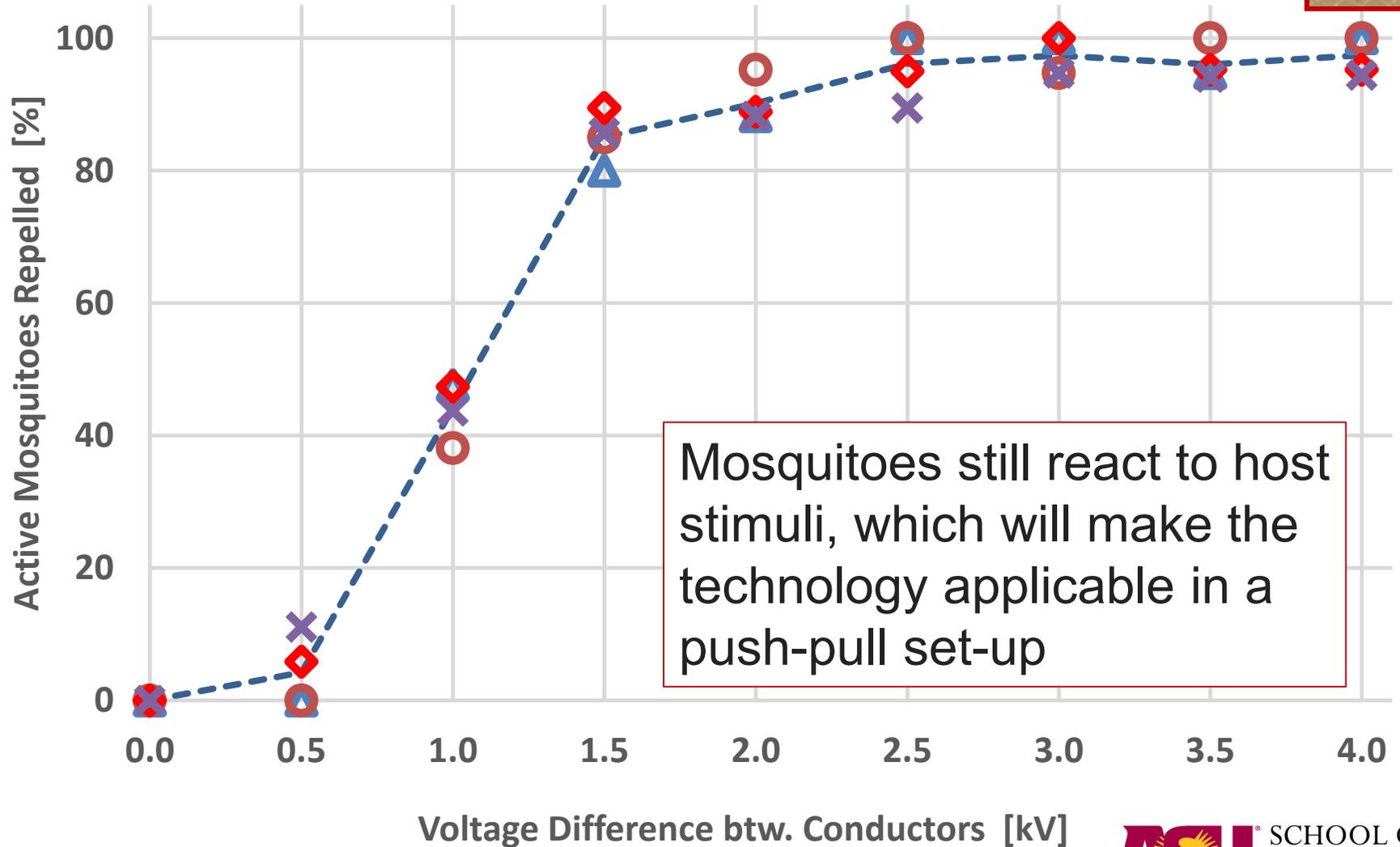


Setup: 4kV \oplus ; $d=2\text{cm}$



Protection 97%

Voltage-repellency relationship

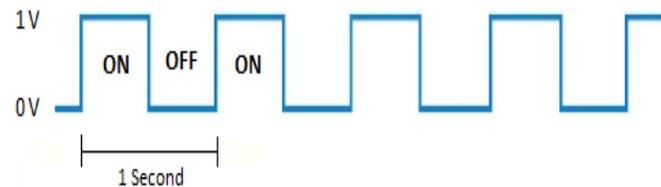


Adding high power pulsed electric fields

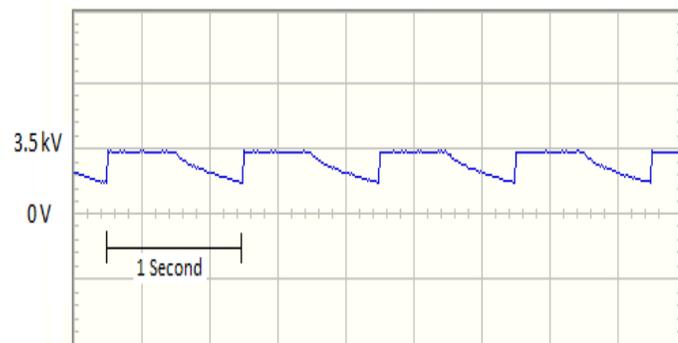


Aim is to create irregular electric fields

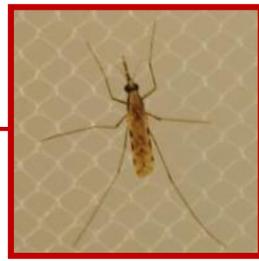
- ✈ Reduce energy requirement
- ✈ Avoid mosquito learning



HV Generator Pulses Applied on Copper Plates

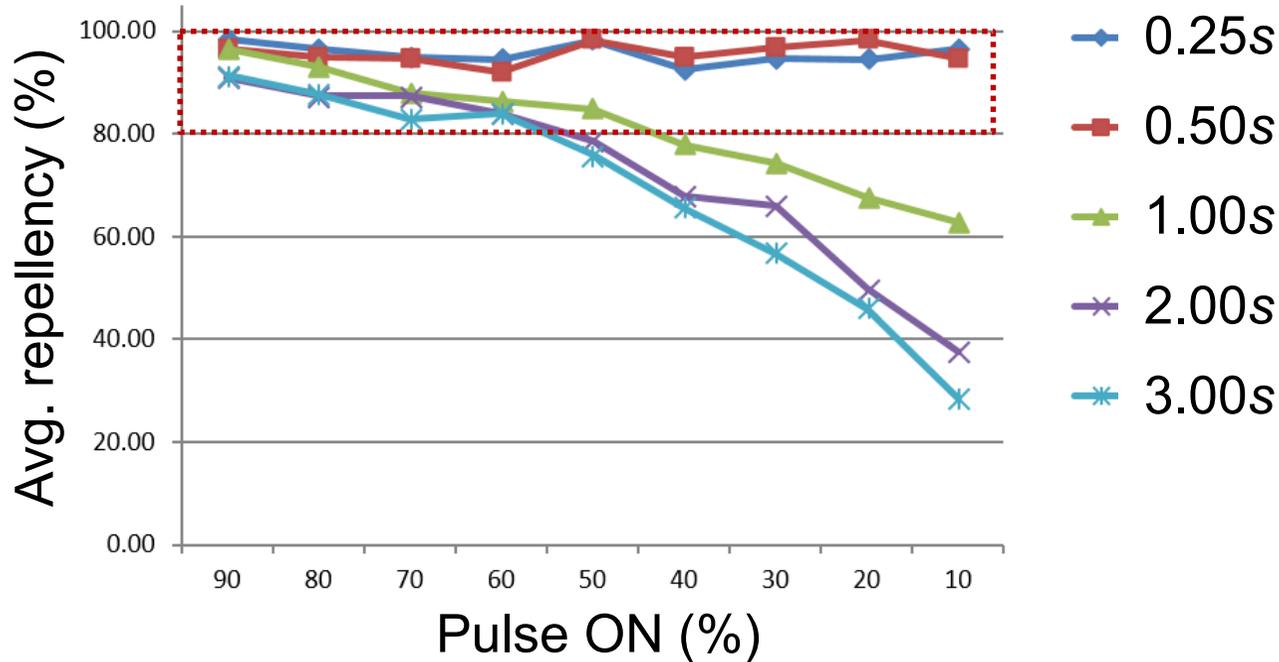


High power pulsed electric fields



Pulsation vs. Repellency

(Applied voltage = 3.5 kV, Distance btw copper electrodes = 3.2 cm, Electrode's width = 6 cm)



Electric field technology works



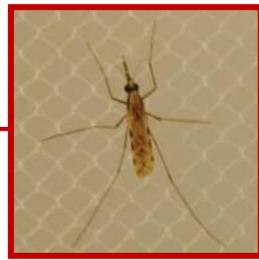
Voltage needed to repel depends on:

- ✈ Electrode material
- ✈ Geometry of electrodes
- ✈ Distance between electrodes
- ✈ Insulation of electrodes

To be tested:

- ✈ Different climatic conditions (field tests)
- ✈ Additional vector mosquito species (but tested on highly persistent mosquito species (*Aedes*))

One centerpiece, different product ideas (Biogents)



Technology is patented

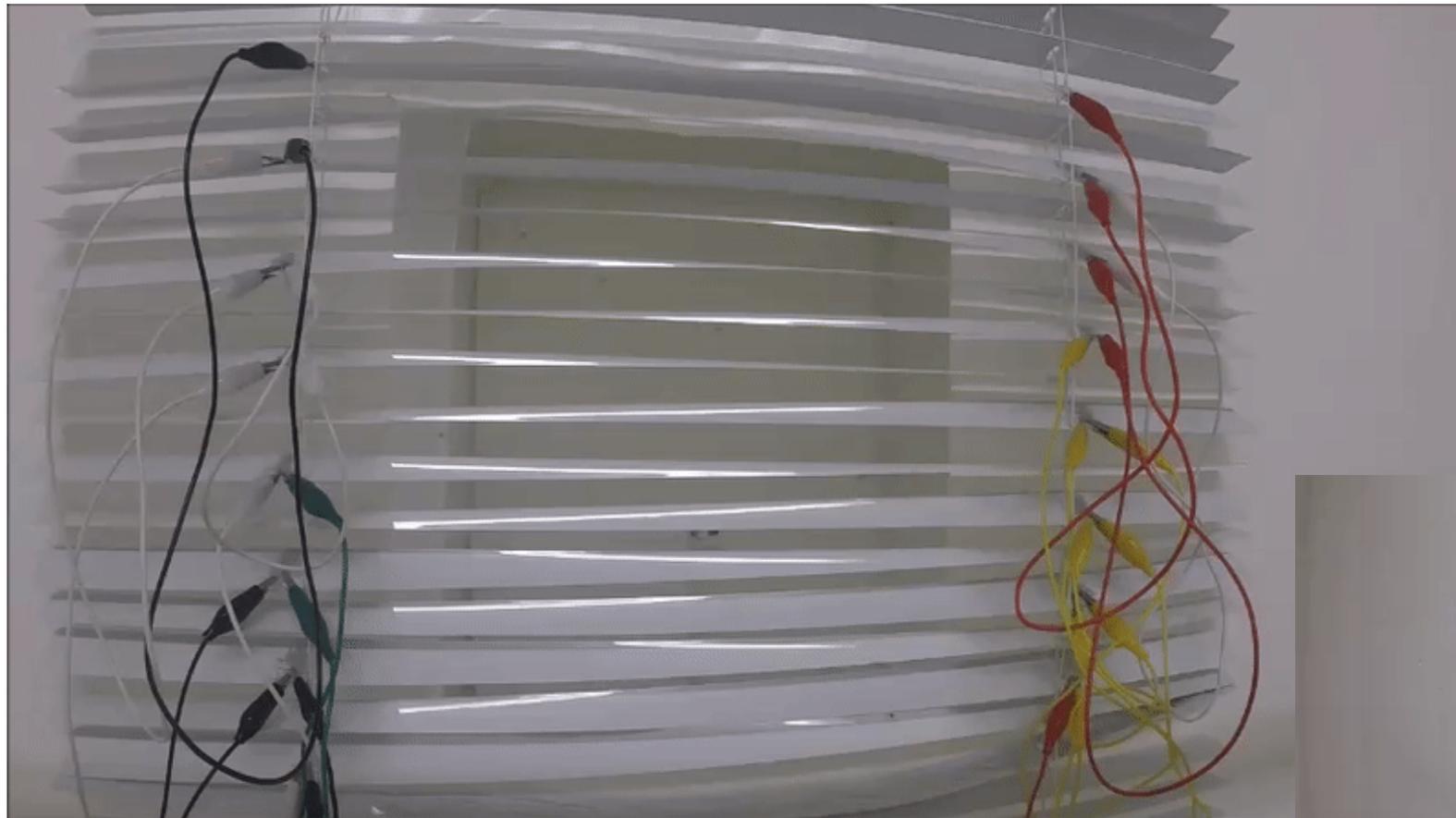
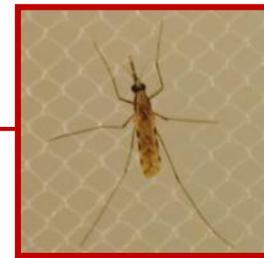
In development: A PnP device that generates and controls the pulsed voltage.

It can be added to a variety of different product types:

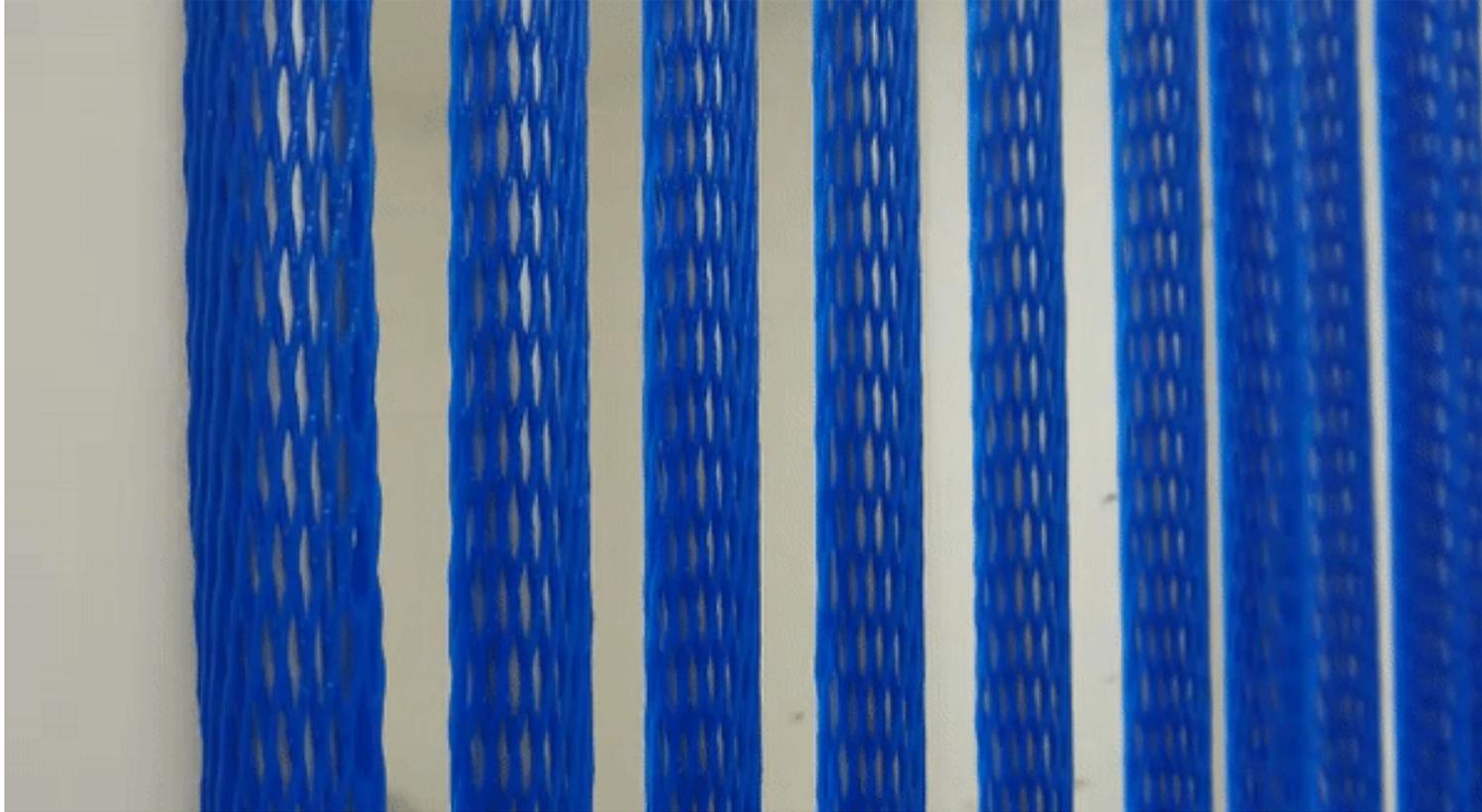
- ✿ Window blinds, shades, bars, etc.
- ✿ Metal chains, rods, tapes or bands to install in door openings, eaves or other wall openings
- ✿ Grids for storm drains, water tanks, etc.
- ✿ Mosquito-repellent fences

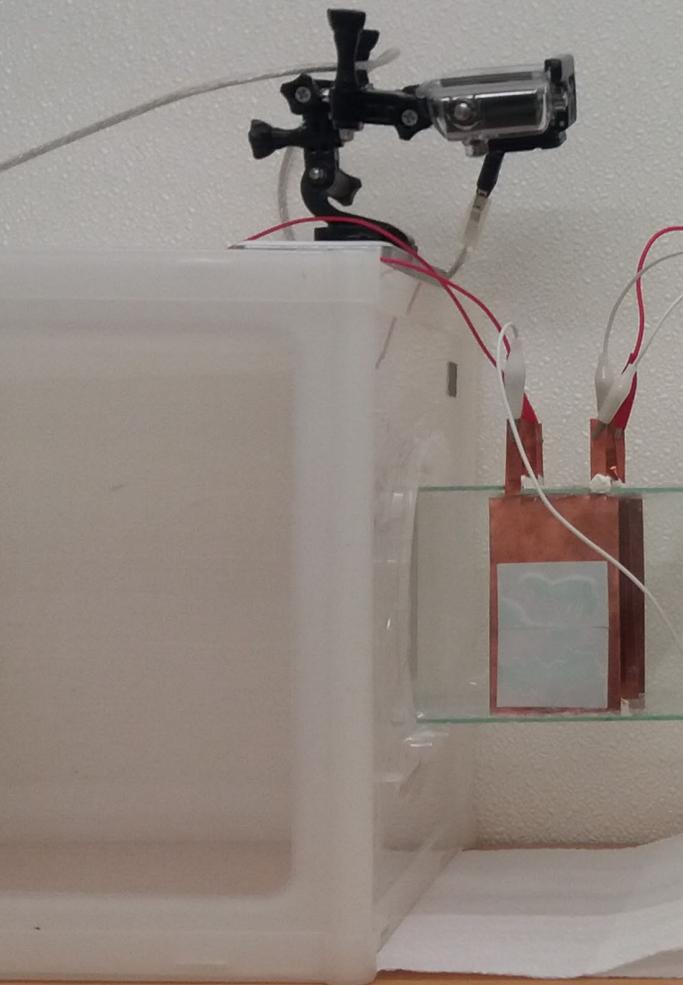
In combination with mosquito traps, a true push-pull mosquito control concept.

Some test videos



Some test videos





For more information

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[@vectorologist](https://twitter.com/vectorologist)

